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EXAMINER	
AHMED, SALMAN	

ART UNIT	PAPER NUMBER
2476	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/015,926	KRISHNAMURTHI ET AL.	
	Examiner	Art Unit	
	SALMAN AHMED	2476	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 February 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2 and 5-68* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 5-68* is/are rejected.

7)☒ Claim(s) *14-23, 54 and 55* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12/10/2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Malmivirta et al. (US PAT 6680913), hereinafter referred to as Malmivirta in view of Walding (US PAT 6031845).

In regards to claim 1, Malmivirta teaches receiving a first message having included therein test settings (column 7 lines 11-13, First, the test equipment sends a test loop closing command related to the data channel, which command can be called CLOSE_Multi-slot_loop_CMD. The closing command may include an identifier on the

basis of which the mobile station knows that the loop is a G loop) selected from among a plurality of possible test settings (column 7 lines 2-10, column 8 lines 30-36, first discussed a case where the test equipment wants the mobile station to loop back the downlink data transmitted on the data channel after demodulation and decryption, i.e. from point 305 to point 309 as depicted by arrow 332, referring to markings in FIG. 3. For simplicity, this test loop can be called the G loop. As an example, let us particularly consider a case where the data channel to be tested is a HSCSD channel, i.e. one in which the data can be located in more than one timeslot in the radio frame. Such a channel may also be called a multi-slot channel. Next it will be considered a case where the test equipment wants the mobile station to loop back the downlink data transmitted on the data channel after demodulation, decryption and channel decoding, i.e. from point 327 to point 330, as depicted by arrow 333 in FIG. 3. For simplicity, this test loop can be called the H loop. Let the data channel to be tested be a HSCSD channel) for one or more channels comprising a reverse traffic channel (column 7 lines 58-60, When the G loop is closed the mobile station loops in principle the information bits of every burst received on the downlink data channel back to a certain uplink burst), one or more auxiliary channels, or a combination thereof, wherein the test settings selected comprise indications for configuring the reverse traffic channel, one or more auxiliary channels, or a combination thereof and indications of loop back packet transmission procedures to be performed during testing (column 7 lines 2-19, first discussed a case where the test equipment wants the mobile station to loop back the downlink data transmitted on the data channel after demodulation and decryption, i.e. from point 305

to point 309 as depicted by arrow 332, referring to markings in FIG. 3. For simplicity, this test loop can be called the G loop. As an example, let us particularly consider a case where the data channel to be tested is a HSCSD channel, i.e. one in which the data can be located in more than one timeslot in the radio frame. Such a channel may also be called a multi-slot channel. First, the test equipment sends a test loop closing command related to the data channel, which command can be called CLOSE_Multi-slot_loop_CMD. The closing command may include an identifier on the basis of which the mobile station knows that the loop is a G loop. Alternatively, it can be specified that if the CLOSE_Multi-slot_loop_CMD message does not include any particular identifier, it orders the closing of the G loop); configuring the one or more channels based on the selected test settings in the first message; receiving test packets via a forward traffic channel; transmitting loop back packets via the reverse traffic channel if indicated by the selected test settings, wherein the loop back packets comprise data for the received test packets (column 7 lines 40-45, columns 7-8 lines 58-8, As soon as the G loop has been closed the test equipment can start sending test data. Testing is preferably carried out such that the test equipment generates test bursts in which the information bits contain desired "raw data", i.e. bit combinations the reception of which is to be examined. Functionally, data transmission and reception occur on the physical protocol level called Layer 1. When the G loop is closed the mobile station loops in principle the information bits of every burst received on the downlink data channel back to a certain uplink burst. It is here assumed bursty transmission. The same principle can easily be generalized to apply to a situation in which the transmission is continuous; this concerns especially

the testing of mobile stations in systems utilizing the code division multiple access (CDMA) method. In the exemplary GSM system each burst has 114 information bits to loop back, excluding the so-called stealing flags. Preferably the loopback does not depend on the contents of the so-called midamble of the received downlink bursts. In uplink bursts the mobile station uses the midamble that it would use anyway. The test equipment receives the uplink bursts sent by the mobile station and demodulates and decrypts them so that the information bits in a received burst can be processed by the test equipment) and transmitting data via the one or more auxiliary channels if indicated by the selected test settings to test the one or more auxiliary channels (column 9 lines 7-24, Above it was said that the mobile station loops all the received data back uplink after the closing of the test loop. However, this is just a general principle. Data channels typically may be asymmetric between the uplink and downlink directions, i.e. a multi-slot channel, for example, may have more downlink timeslots than uplink timeslots per frame. To take this into account, advantageous operation both in the G loop case and H loop case includes two alternative mechanisms, and the test equipment can indicate in its CLOSE_Multi-slot_loop_CMD message which one of the mechanisms is activated. According to the first mechanism, the mobile station loops the data received in a given downlink timeslot back to a certain timeslot of the uplink channel which in HSCSD is called the main uplink slot and in GPRS the uplink PACCH timeslot (i.e. auxiliary channels). The downlink timeslot the looping back of which is thus specified is called timeslot X. The invention does not limit the specification of timeslot X).

Malmivirta does not explicitly teach signaling data is sent via a auxiliary channel.

Walding in the same field of endeavor teaches the overhead channel (i.e. auxiliary channel) is provided for carrying control information (i.e. signaling packets) used to establish and maintain the downlink and uplink communication paths (column 1 lines 48-50).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta's system/method by incorporating the steps of signaling data being sent via auxiliary channel as suggested by Walding. The motivation is that (as suggested by Walding, column 1 lines 48-50) the overhead channel (i.e. auxiliary channel) is provided for carrying control information (i.e. signaling packets) used to establish and maintain the downlink and uplink communication paths. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

In regards to claim 2 Malmivirta teaches each loop back packet includes data descriptive of one or more test packets (column 8 lines 51-62, the operation according to the H loop differs from that of the G loop in that as channel decoding has been performed before the data are looped back uplink, the mobile station is able to examine whether the received data frames contain errors that are revealed by means of checksums included in the data frames. The contents of all error-free received data frames are looped back to uplink data frames belonging to the same data channel and those uplink data frames are fed to the channel encoder. If the mobile station detects an erroneous data frame it notifies the test equipment e.g. by filling the appropriate

uplink data frame with zeroes before the uplink data frame is fed to the channel encoder).

4. Claims 32 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Malmivirta et al. (US PAT 6680913), hereinafter referred to as Malmivirta in view of Walding (US PAT 6031845) and Gillespie (US PAT 6014377).

In regards to claims 32 and 33, Malmivirta teaches receiving a first message having included therein test settings (column 7 lines 11-13, First, the test equipment sends a test loop closing command related to the data channel, which command can be called CLOSE_Multi-slot_loop_CMD. The closing command may include an identifier on the basis of which the mobile station knows that the loop is a G loop) selected from among a plurality of possible test settings (column 7 lines 2-10, column 8 lines 30-36, first discussed a case where the test equipment wants the mobile station to loop back the downlink data transmitted on the data channel after demodulation and decryption, i.e. from point 305 to point 309 as depicted by arrow 332, referring to markings in FIG. 3. For simplicity, this test loop can be called the G loop. As an example, let us particularly consider a case where the data channel to be tested is a HSCSD channel, i.e. one in which the data can be located in more than one timeslot in the radio frame. Such a channel may also be called a multi-slot channel. Next it will be considered a case where the test equipment wants the mobile station to loop back the downlink data transmitted on the data channel after demodulation, decryption and channel decoding, i.e. from point 327 to point 330, as depicted by arrow 333 in FIG. 3. For simplicity, this

test loop can be called the H loop. Let the data channel to be tested be a HSCSD channel) for one or more channels comprising a reverse traffic channel (column 7 lines 58-60, When the G loop is closed the mobile station loops in principle the information bits of every burst received on the downlink data channel back to a certain uplink burst), one or more auxiliary channels, or a combination thereof, wherein the test settings selected comprise indications for configuring the reverse traffic channel, one or more auxiliary channels, or a combination thereof and indications of loop back packet transmission procedures to be performed during testing (column 7 lines 2-19, first discussed a case where the test equipment wants the mobile station to loop back the downlink data transmitted on the data channel after demodulation and decryption, i.e. from point 305 to point 309 as depicted by arrow 332, referring to markings in FIG. 3. For simplicity, this test loop can be called the G loop. As an example, let us particularly consider a case where the data channel to be tested is a HSCSD channel, i.e. one in which the data can be located in more than one timeslot in the radio frame. Such a channel may also be called a multi-slot channel. First, the test equipment sends a test loop closing command related to the data channel, which command can be called CLOSE_Multi-slot_loop_CMD. The closing command may include an identifier on the basis of which the mobile station knows that the loop is a G loop. Alternatively, it can be specified that if the CLOSE_Multi-slot_loop_CMD message does not include any particular identifier, it orders the closing of the G loop); configuring the one or more channels based on the selected test settings in the first message; receiving test packets via a forward traffic channel; transmitting loop back packets via the reverse traffic

channel if indicated by the selected test settings, wherein the loop back packets comprise data for the received test packets (column 7 lines 40-45, columns 7-8 lines 58-8, As soon as the G loop has been closed the test equipment can start sending test data. Testing is preferably carried out such that the test equipment generates test bursts in which the information bits contain desired "raw data", i.e. bit combinations the reception of which is to be examined. Functionally, data transmission and reception occur on the physical protocol level called Layer 1. When the G loop is closed the mobile station loops in principle the information bits of every burst received on the downlink data channel back to a certain uplink burst. It is here assumed bursty transmission. The same principle can easily be generalized to apply to a situation in which the transmission is continuous; this concerns especially the testing of mobile stations in systems utilizing the code division multiple access (CDMA) method. In the exemplary GSM system each burst has 114 information bits to loop back, excluding the so-called stealing flags. Preferably the loopback does not depend on the contents of the so-called midamble of the received downlink bursts. In uplink bursts the mobile station uses the midamble that it would use anyway. The test equipment receives the uplink bursts sent by the mobile station and demodulates and decrypts them so that the information bits in a received burst can be processed by the test equipment) and transmitting data via the one or more auxiliary channels if indicated by the selected test settings to test the one or more auxiliary channels (column 9 lines 7-24, Above it was said that the mobile station loops all the received data back uplink after the closing of the test loop. However, this is just a general principle. Data channels typically may be

asymmetric between the uplink and downlink directions, i.e. a multi-slot channel, for example, may have more downlink timeslots than uplink timeslots per frame. To take this into account, advantageous operation both in the G loop case and H loop case includes two alternative mechanisms, and the test equipment can indicate in its CLOSE_Multi-slot_loop_CMD message which one of the mechanisms is activated. According to the first mechanism, the mobile station loops the data received in a given downlink timeslot back to a certain timeslot of the uplink channel which in HSCSD is called the main uplink slot and in GPRS the uplink PACCH timeslot (i.e. auxiliary channels). The downlink timeslot the looping back of which is thus specified is called timeslot X. The invention does not limit the specification of timeslot X).

Malmivirta does not explicitly teach signaling data is sent via a auxiliary channel.

Walding in the same field of endeavor teaches the overhead channel (i.e. auxiliary channel) is provided for carrying control information (i.e. signaling packets) used to establish and maintain the downlink and uplink communication paths (column 1 lines 48-50).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta's system/method by incorporating the steps of signaling data being sent via auxiliary channel as suggested by Walding. The motivation is that (as suggested by Walding, column 1 lines 48-50) the overhead channel (i.e. auxiliary channel) is provided for carrying control information (i.e. signaling packets) used to establish and maintain the downlink and uplink communication paths. Known work in one field of endeavor may prompt variations of it for use in either the same field

or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

Malmivirta and Walding do not explicitly teach testing Auxiliary control channel.

Gillespie in the same or similar field of endeavor teaches testing Auxiliary control channel (column 5 lines 55-58).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta and Walding's system/method by incorporating the steps of testing Auxiliary control channel as suggested by Gillespie. The motivation is that such method enables the system to diagnose all channels of communication for performance, reliability and interference among other things; thus making the system optimum. Known work (i.e. diagnose all channels) in one field of endeavor (Gillespie prior art) may prompt variations of it for use in either the same field or a different one (Malmivirta and Walding prior art) based on design incentives (i.e. performance, reliability and interference) or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

5. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Malmivirta et al. (US PAT 6680913), hereinafter referred to as Malmivirta in view of Walding (US PAT 6031845), Gillespie (US PAT 6014377) and Gopalakrishnan et al. (US PAT 7110466, hereinafter Gopalakrishnan).

In regards to claim 34 Malmivirta, Walding and Gillespie teach all the limitations of claim 32, but do not explicitly teach auxiliary channels comprise at least one of an acknowledgment (ACK) channel and a data rate control (DRC) channel

Gopalakrishnan in the same field of endeavor teaches control channel (auxiliary channel) being DRC channel (column 1 lines 42-43).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta, Walding and Gillespie's system/method by incorporating the steps of control channel being DRC channel as suggested by Gopalakrishnan. The motivation is that (as suggested by Gopalakrishnan, column 1 lines 42-48) the pilot/DRC channel is transmitted by the mobile to provide the base station with a pilot signal that the base station uses to reliably demodulate other transmissions from the mobile to the base station and further the pilot/DRC is also used to provide the base station with data rate request information from the mobile to efficiently control transmission rate. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

6. Claims 35-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Malmivirta et al. (US PAT 6680913), hereinafter referred to as Malmivirta in view of Walding (US PAT 6031845), Gillespie (US PAT 6014377) and Numminen et al. (US PAT 6687499, hereinafter Numminen).

In regards to claim 35-38 Malmivirta, Walding and Gillespie teach all the limitations of claim 32, but do not explicitly teach first message includes a test setting for a particular bit value to be transmitted on an acknowledgment (ACK) channel; the first message includes a test setting for a particular value to be transmitted on a data rate control (DRC) channel; the first message includes a test setting for a particular cover to be used for a data rate control (DRC) channel; the first message includes a test setting indicative of maintenance of a test mode in event of a connection closure or a lost connection.

In regards to claims 35-37 Numminen in the same or similar field of endeavor teaches the first message includes a test setting for a particular bit value to be transmitted on an acknowledgment (ACK) channel (column 6 lines 54-56, column 6 lines 66-67 and column 7 lines 1-8, the test equipment sends an immediate assignment 503 which may include various instructions for the mobile station. Particularly the immediate assignment 503 contains so-called rest octets in which the first two bits indicate the contents of the rest of the rest octet. By the priority date of this patent application values 11 and 10 of the values of the first two bits of the rest octet have been reserved but values 01 and 00 are unused. In accordance with a preferred embodiment of the invention at least one of these values can be reserved to indicate that in response to the immediate assignment 503 the mobile station to be tested has to set itself in a special test mode) or the first message includes a test setting (column 6 lines 54-56, column 6 lines 66-67 and column 7 lines 1-8, the test equipment sends an immediate assignment 503 which may include various instructions for the mobile

station. Particularly the immediate assignment 503 contains so-called rest octets in which the first two bits indicate the contents of the rest of the rest octet. By the priority date of this patent application values 11 and 10 of the values of the first two bits of the rest octet have been reserved but values 01 and 00 are unused. In accordance with a preferred embodiment of the invention at least one of these values can be reserved to indicate that in response to the immediate assignment 503 the mobile station to be tested has to set itself in a special test mode) for a particular value to be transmitted on a data rate control (DRC) channel or the first message includes a test setting (column 6 lines 54-56, column 6 lines 66-67 and column 7 lines 1-8, the test equipment sends an immediate assignment 503 which may include various instructions for the mobile station. Particularly the immediate assignment 503 contains so-called rest octets in which the first two bits indicate the contents of the rest of the rest octet. By the priority date of this patent application values 11 and 10 of the values of the first two bits of the rest octet have been reserved but values 01 and 00 are unused. In accordance with a preferred embodiment of the invention at least one of these values can be reserved to indicate that in response to the immediate assignment 503 the mobile station to be tested has to set itself in a special test mode) for a particular cover to be used for a data rate control (DRC) channel (column 6 lines 20-61). In regards to claim 38 Numminen in the same or similar field of endeavor teaches the first message includes a test setting indicative of maintenance of a test mode in event of a connection closure or a lost connection (column 7 lines 18-20, So test mode means

that the mobile station to be tested is instructed to maintain a connection on a certain transmission channel. The mobile station is kept in the test mode by Layer 3 signaling).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta, Walding and Gillespie's system/method by incorporating the steps of first message includes a test setting for a particular bit value to be transmitted on an acknowledgment (ACK) channel; the first message includes a test setting for a particular value to be transmitted on a data rate control (DRC) channel; the first message includes a test setting for a particular cover to be used for a data rate control (DRC) channel; the first message includes a test setting indicative of maintenance of a test mode in event of a connection closure or a lost connection as suggested by Gopalakrishnan. The motivation is that by designating various bits to identify various settings for various channels for testing, system can reliably and seamlessly perform desired testing of desired channels. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Malmivirta et al. (US PAT 6680913), hereinafter referred to as Malmivirta in view of Walding (US PAT 6031845) and Funk et al. (US PAT 6766164), hereinafter referred to as Funk.

In regards to claim 5, Malmivirta teaches a memory communicatively coupled to a digital signal processing device (DSPD) (column 6 lines 57-59) and implicitly teaches loopback packet being formed for particular time interval (column 7 lines 28-35, the mobile station closes the test loop in a certain period of time from the sending of the acknowledge. Compatibility with certain functions specified earlier may require that a certain value be specified for said period of time. In the GSM system an advantageous value for said period of time is one so-called reporting period, i.e. the duration of a block on the SACCH channel, which corresponds to the length of 104 radio frames) and in view of Walding teach all the limitations of claim 1 above.

Malmivirta and Walding do not explicitly teach test packet is formed for each particular time interval.

Funk in the same field of endeavor teaches test packets being formed for particular time interval (column 3 lines 61-67).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta and Walding's method by incorporating one loop back packet being formed for each particular time interval as taught by Funk. The motivation is that generating and sending test packets at regular interval helps to diagnose a communication system very efficiently and effectively. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

8. Claims 6-8, 10-13 and 24-28 and are rejected under 35 U.S.C. 103(a) as being unpatentable over Malmivirta et al. (US PAT 6680913), hereinafter referred to as Malmivirta in view of Mawhinney et al. (US PAT 5898674, hereinafter Mawhinney) and Brady (US PAT 3922508), hereinafter referred to as Brady.

In regards to claims 6 and 10, Malmivirta teaches *receiving a first data transmission comprising test packets of known test data via a first channel* (column 7 lines 40-45, columns 7-8 lines 58-8, As soon as the G loop has been closed the test equipment can start sending test data. Testing is preferably carried out such that the test equipment generates test bursts in which the information bits contain desired "raw data", i.e. bit combinations the reception of which is to be examined. Functionally, data transmission and reception occur on the physical protocol level called Layer 1. When the G loop is closed the mobile station loops in principle the information bits of every burst received on the downlink data channel back to a certain uplink burst. It is here assumed bursty transmission. The same principle can easily be generalized to apply to a situation in which the transmission is continuous; this concerns especially the testing of mobile stations in systems utilizing the code division multiple access (CDMA) method. In the exemplary GSM system each burst has 114 information bits to loop back, excluding the so-called stealing flags. Preferably the loopback does not depend on the contents of the so-called midamble of the received downlink bursts. In uplink bursts the mobile station uses the midamble that it would use anyway. The test equipment receives the uplink bursts sent by the mobile station and demodulates and decrypts them so that the information bits in a received burst can be processed by the

test equipment) *and transmitting the second data transmission via a second channel* (column 7 lines 58-60, when the G loop is closed the mobile station loops in principle the information bits of every burst received on the downlink data channel back to a certain uplink burst).

Malmivirta does not explicitly teach *identifying parameter values descriptive of the test packets received in the first data transmission, wherein the parameter values for each test packet comprise at least one of a serving sector from which the test packet was received, a sequence number of the test packet, and a length of the test packet; forming a second data transmission comprising the identified parameter values for test packets received.*

Mawhinney in the similar field of endeavor teaches *identifying parameter values descriptive of the test packets received in the first data transmission during the observation interval, wherein the parameter values for each test packet comprise at least one of a serving sector from which the test packet was received, a sequence number of the test packet, and a length of the test packet; forming a second data transmission comprising the identified parameter values for all test packets received* (Figure 5 sequence number field, column 3 lines 38-53, column 11 lines 45-60, lines column 12 lines 1-15, column 4 lines 44-47, the testing means have a transmitter means for transmitting the test sequence to the second device across the diagnostic channel. A receiver is associated with the second device for receiving and <u>identifying</u> the <u>test sequence</u> transmitted by the first device. Responding means associated with the second device for responding to the test sequence, the responding means being

configured to transmit its response over the diagnostic channel, back to the first device. Finally, evaluating means are associated with the first device for identifying the response. The specific operation of the particular elements, such as the responding means and the evaluating means still necessarily vary, depending upon the particular diagnostic test being executed. For example, the operation of the elements, while executing a diagnostic pattern test, will be different than when executing a loopback test. A loopback test is typically run in conjunction with a send pattern and/monitor pattern command. When loopback is active on a virtual circuit, all frames received on the diagnostic channel of that circuit are transmitted back to the originating device. The originating device, then, after transmitting a pattern, will monitor the diagnostic channel to evaluate whether the transmitted packet is in fact received. By monitoring the integrity of the received, loopbacked results, the transmitting device can evaluate the condition of the virtual circuit. In keeping within the description of FIG. 5, a <u>sequence number</u> will typically be utilized for tests in which sequence checking is required. In addition to the errors depicted in FIGS. 6A and 6B, errors could also be diagnosed if the pattern received by the receiving device (FIG. 6A embodiment) did not correlate with the expected pattern. A device on the receiving end will be instructed as to the pattern type and sequence, and thus will know the particular pattern and sequence of data that it expects to receive. It can then monitor the pattern data and sequence received over the diagnostic channel to verify whether that channel is, in fact, properly transmitting data. The accurate reception of data will indicate to the receiving unit that the transmission line defined by the virtual circuit is in good and proper working order. Faulty data will be

an indication that there is some type of error or system fault along or within the virtual circuit. A loopback test is typically run in conjunction with a send pattern and/monitor pattern command. When loopback is active on a virtual circuit, all frames received on the diagnostic channel of that circuit are transmitted back to the originating device).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta's system/method by incorporating the steps of *identifying parameter values descriptive of the test packets received in the first data transmission during the observation interval, wherein the parameter values for each test packet comprise at least one of a serving sector from which the test packet was received, a sequence number of the test packet, and a length of the test packet; forming a second data transmission comprising the identified parameter values for test packets received* as suggested by Mawhinney. The motivation is that (as suggested by Mashinney, column 11 lines 45-60) a device on the receiving end will be instructed as to the pattern type and sequence, and thus will know the particular pattern and sequence of data that it expects to receive; It can then monitor the pattern data and sequence received over the diagnostic channel to verify whether that channel is, in fact, properly transmitting data; The accurate reception of data will indicate to the receiving unit that the transmission line defined by the circuit is in good and proper working order; Faulty data will be an indication that there is some type of error or system fault along or within the circuit. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market

forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

Malmivirta and Mawhinney do not explicitly teach observation interval for testing.

Brady in the similar field of endeavor teaches in column 4 lines 35-38, relay 48 includes a timer built therein which holds the relay in the loopback position for a predetermined period (interpreted as observation interval) of time during which suitable loopback tests may be performed.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta and Mawhinney's system/method by incorporating the steps of observation interval for testing as suggested by Brady. The motivation is that such interval limits that time in which tests can be performed leaving open other times for regular operation of the device. Further motivation is that generating and sending test packets at regular interval helps to diagnose a communication system very efficiently and effectively. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

In regards to claim 7, Malmivirta teaches the first channel is a forward traffic channel and the second channel is a reverse traffic channel (abstract).

In regards to claim 8, Malmivirta teaches the second data transmission comprises a plurality of loop back packets, and wherein the loop back packets include the parameter values descriptive of the test packets (column 7 lines 40-45, columns 7-8

lines 58-8, As soon as the G loop has been closed the test equipment can start sending test data. Testing is preferably carried out such that the test equipment generates test bursts in which the information bits contain desired "raw data", i.e. bit combinations the reception of which is to be examined. Functionally, data transmission and reception occur on the physical protocol level called Layer 1. When the G loop is closed the mobile station loops in principle the information bits of every burst received on the downlink data channel back to a certain uplink burst. It is here assumed bursty transmission. The same principle can easily be generalized to apply to a situation in which the transmission is continuous; this concerns especially the testing of mobile stations in systems utilizing the code division multiple access (CDMA) method. In the exemplary GSM system each burst has 114 information bits to loop back, excluding the so-called stealing flags. Preferably the loopback does not depend on the contents of the so-called midamble of the received downlink bursts. In uplink bursts the mobile station uses the midamble that it would use anyway. The test equipment receives the uplink bursts sent by the mobile station and demodulates and decrypts them so that the information bits in a received burst can be processed by the test equipment).

In regards to claims 11 and 25, Malmivirta teaches loop back packet includes a field indicative of a specific protocol to which the loop back packet belongs (column 7 lines 45-48, functionally, data transmission and reception occur on the physical protocol level called Layer 1. In principle, the testing need not involve any higher protocol levels in the mobile station. Therefore inherently loopback packets will have fields indicating that protocol is a Layer 1 packet protocol).

In regards to claims 12 and 26, Malmivirta does not explicitly teach loop back packet includes a field indicative of a specific packet type for the loop back packet.

Mawhinney in the same or similar field of endeavor teaches loop back packet includes a field indicative of a specific packet type for the loop back packet (figure 5, message type).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta's system/method by incorporating the steps of loop back packet includes a field indicative of a specific packet type for the loop back packet as suggested by Mawhinney. The motivation is that (as suggested by Mawhinney, column 11, lines 18-20) the message type is used to indicate the type and disposition of the present frame. For example, whether the test is a pattern test, a connectivity test, a loopback test, etc. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

In regards to claim 13, Malmivirta does not explicitly teach loop back packet includes a field indicative of a start of a specific time interval covered by the loop back packet.

Mawhinney in the same or similar field of endeavor teaches loop back packet includes a field indicative of a start of a specific time interval covered by the loop back packet (figure 5, timestamp).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta's system/method by incorporating the steps of loop back packet includes a field indicative of a start of a specific time interval covered by the loop back packet as suggested by Mawhinney. The motivation is that (as suggested by Mawhinney, column 12, lines 10-12) a time stamp may be used for certain tests, when, for example, calculating the round trip transmission time. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

In regards to claims 24 and 27 Malmivirta does not explicitly teach each loop back packet includes a parameter value indicative of omission of one or more test packets.

Mawhinney in the same or similar field of endeavor teaches each loop back packet includes a parameter value indicative of omission of one or more test packets (column 12 lines 32-37, Utilizing the sequence number (i.e. parameter), a transmitting device may look for acknowledgments of the various packets transmitted. If a return/acknowledgment is received out of sequence, the transmitting device will know that intermediate packets were dropped).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta's system/method by incorporating the steps of each loop back packet includes a parameter value indicative of omission of one or more test packets as suggested by Mawhinney. The motivation is that (as suggested by

Mawhinney, column 12 lines 32-37) if a return/acknowledgment is received out of sequence, the transmitting device will know that intermediate packets were dropped. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

In regards to claim 28, Malmivirta teaches a memory communicatively coupled to a digital signal processing device (DSPD) (column 6 lines 57-59) *receiving a first data transmission comprising test packets of known test data via a first channel* (column 7 lines 40-45, columns 7-8 lines 58-8, As soon as the G loop has been closed the test equipment can start sending test data. Testing is preferably carried out such that the test equipment generates test bursts in which the information bits contain desired "raw data", i.e. bit combinations the reception of which is to be examined. Functionally, data transmission and reception occur on the physical protocol level called Layer 1. When the G loop is closed the mobile station loops in principle the information bits of every burst received on the downlink data channel back to a certain uplink burst. It is here assumed bursty transmission. The same principle can easily be generalized to apply to a situation in which the transmission is continuous; this concerns especially the testing of mobile stations in systems utilizing the code division multiple access (CDMA) method. In the exemplary GSM system each burst has 114 information bits to loop back, excluding the so-called stealing flags. Preferably the loopback does not depend on the contents of the so-called midamble of the received downlink bursts. In uplink bursts the mobile station uses the midamble that it would use anyway. The test

equipment receives the uplink bursts sent by the mobile station and demodulates and decrypts them so that the information bits in a received burst can be processed by the test equipment) *and transmitting the second data transmission via a second channel* (column 7 lines 58-60, when the G loop is closed the mobile station loops in principle the information bits of every burst received on the downlink data channel back to a certain uplink burst).

Malmivirta does not explicitly teach *identifying parameter values descriptive of the test packets received in the first data transmission, wherein the parameter values for each test packet comprise at least one of a serving sector from which the test packet was received, a sequence number of the test packet, and a length of the test packet; forming a second data transmission comprising the identified parameter values for test packets received.*

Mawhinney in the similar field of endeavor teaches *identifying parameter values descriptive of the test packets received in the first data transmission during the observation interval, wherein the parameter values for each test packet comprise at least one of a serving sector from which the test packet was received, a sequence number of the test packet, and a length of the test packet; forming a second data transmission comprising the identified parameter values for test packets received* (Figure 5 sequence number field, column 3 lines 38-53, column 11 lines 45-60, lines column 12 lines 1-15, column 4 lines 44-47, the testing means have a transmitter means for transmitting the test sequence to the second device across the diagnostic channel. A receiver is associated with the second device for receiving and <u>identifying</u>

the test sequence transmitted by the first device. Responding means associated with the second device for responding to the test sequence, the responding means being configured to transmit its response over the diagnostic channel, back to the first device. Finally, evaluating means are associated with the first device for identifying the response. The specific operation of the particular elements, such as the responding means and the evaluating means still necessarily vary, depending upon the particular diagnostic test being executed. For example, the operation of the elements, while executing a diagnostic pattern test, will be different than when executing a loopback test. A loopback test is typically run in conjunction with a send pattern and/monitor pattern command. When loopback is active on a virtual circuit, all frames received on the diagnostic channel of that circuit are transmitted back to the originating device. The originating device, then, after transmitting a pattern, will monitor the diagnostic channel to evaluate whether the transmitted packet is in fact received. By monitoring the integrity of the received, loopbacked results, the transmitting device can evaluate the condition of the virtual circuit. In keeping within the description of FIG. 5, a sequence number will typically be utilized for tests in which sequence checking is required. In addition to the errors depicted in FIGS. 6A and 6B, errors could also be diagnosed if the pattern received by the receiving device (FIG. 6A embodiment) did not correlate with the expected pattern. A device on the receiving end will be instructed as to the pattern type and sequence, and thus will know the particular pattern and sequence of data that it expects to receive. It can then monitor the pattern data and sequence received over the diagnostic channel to verify whether that channel is, in fact, properly transmitting data.

The accurate reception of data will indicate to the receiving unit that the transmission line defined by the virtual circuit is in good and proper working order. Faulty data will be an indication that there is some type of error or system fault along or within the virtual circuit. A loopback test is typically run in conjunction with a send pattern and/monitor pattern command. When loopback is active on a virtual circuit, all frames received on the diagnostic channel of that circuit are transmitted back to the originating device).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta's system/method by incorporating the steps of *identifying parameter values descriptive of the test packets received in the first data transmission during the observation interval, wherein the parameter values for each test packet comprise at least one of a serving sector from which the test packet was received, a sequence number of the test packet, and a length of the test packet; forming a second data transmission comprising the identified parameter values for test packets received* as suggested by Mawhinney. The motivation is that (as suggested by Mashinney, column 11 lines 45-60) a device on the receiving end will be instructed as to the pattern type and sequence, and thus will know the particular pattern and sequence of data that it expects to receive; It can then monitor the pattern data and sequence received over the diagnostic channel to verify whether that channel is, in fact, properly transmitting data; The accurate reception of data will indicate to the receiving unit that the transmission line defined by the circuit is in good and proper working order; Faulty data will be an indication that there is some type of error or system fault along or within the circuit. Known work in one field of endeavor may prompt variations of it for use in

either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

Malmivirta and Mawhinney do not explicitly teach observation interval for testing.

Brady in the similar field of endeavor teaches in column 4 lines 35-38, relay 48 includes a timer built therein which holds the relay in the loopback position for a predetermined period (interpreted as observation interval) of time during which suitable loopback tests may be performed.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta and Mawhinney's system/method by incorporating the steps of observation interval for testing as suggested by Brady. The motivation is that such interval limits that time in which tests can be performed leaving open other times for regular operation of the device. Further motivation is that generating and sending test packets at regular interval helps to diagnose a communication system very efficiently and effectively. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

9. Claims 29-31 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Malmivirta et al. (US PAT 6680913), hereinafter referred to as Malmivirta in view of Mawhinney et al. (US PAT 5898674, hereinafter Mawhinney), Brady (US PAT

3922508), hereinafter referred to as Brady and Engbersen (US PAT 5271000, hereinafter Engbersen).

In regards to claim 29, Malmivirta teaches receiving a plurality of test packets of known test data via a forward traffic channel (column 7 lines 40-45, columns 7-8 lines 58-8, As soon as the G loop has been closed the test equipment can start sending test data. Testing is preferably carried out such that the test equipment generates test bursts in which the information bits contain desired "raw data", i.e. bit combinations the reception of which is to be examined. Functionally, data transmission and reception occur on the physical protocol level called Layer 1. When the G loop is closed the mobile station loops in principle the information bits of every burst received on the downlink data channel (i.e. forward traffic channel) back to a certain uplink burst. It is here assumed bursty transmission. The same principle can easily be generalized to apply to a situation in which the transmission is continuous; this concerns especially the testing of mobile stations in systems utilizing the code division multiple access (CDMA) method. In the exemplary GSM system each burst has 114 information bits to loop back, excluding the so-called stealing flags. Preferably the loopback does not depend on the contents of the so-called midamble of the received downlink bursts. In uplink bursts the mobile station uses the midamble that it would use anyway. The test equipment receives the uplink bursts sent by the mobile station and demodulates and decrypts them so that the information bits in a received burst can be processed by the test equipment); and transmitting the loop back packets via a reverse traffic channel (column 7 lines 58-60, when the G loop is closed the mobile station loops in principle

the information bits of every burst received on the downlink data channel back to a certain uplink burst).

Malmivirta does not explicitly teach *identifying parameter values descriptive of the test packets received in the first data transmission, wherein the parameter values for each test packet comprise sequence number of the test packet; forming a second data transmission comprising sequence number for every covered test packets received.*

Mawhinney in the similar field of endeavor teaches *identifying parameter values descriptive of the test packets received in the first data transmission, wherein the parameter values for each test packet comprise sequence number of the test packet; forming a second data transmission comprising sequence number for every covered test packets received* (Figure 5 sequence number field, column 3 lines 38-53, column 11 lines 45-60, lines column 12 lines 1-15, column 4 lines 44-47, the testing means have a transmitter means for transmitting the test sequence to the second device across the diagnostic channel. A receiver is associated with the second device for receiving and <u>identifying</u> the <u>test sequence</u> transmitted by the first device. Responding means associated with the second device for responding to the test sequence, the responding means being configured to transmit its response over the diagnostic channel, back to the first device. Finally, evaluating means are associated with the first device for identifying the response. The specific operation of the particular elements, such as the responding means and the evaluating means still necessarily vary, depending upon the particular diagnostic test being executed. For example, the operation of the elements, while executing a diagnostic pattern test, will be different

than when executing a loopback test. A loopback test is typically run in conjunction with a send pattern and/monitor pattern command. When loopback is active on a virtual circuit, all frames received on the diagnostic channel of that circuit are transmitted back to the originating device. The originating device, then, after transmitting a pattern, will monitor the diagnostic channel to evaluate whether the transmitted packet is in fact received. By monitoring the integrity of the received, loopbacked results, the transmitting device can evaluate the condition of the virtual circuit. In keeping within the description of FIG. 5, a sequence number will typically be utilized for tests in which sequence checking is required. In addition to the errors depicted in FIGS. 6A and 6B, errors could also be diagnosed if the pattern received by the receiving device (FIG. 6A embodiment) did not correlate with the expected pattern. A device on the receiving end will be instructed as to the pattern type and sequence, and thus will know the particular pattern and sequence of data that it expects to receive. It can then monitor the pattern data and sequence received over the diagnostic channel to verify whether that channel is, in fact, properly transmitting data. The accurate reception of data will indicate to the receiving unit that the transmission line defined by the virtual circuit is in good and proper working order. Faulty data will be an indication that there is some type of error or system fault along or within the virtual circuit. A loopback test is typically run in conjunction with a send pattern and/monitor pattern command. When loopback is active on a virtual circuit, all frames received on the diagnostic channel of that circuit are transmitted back to the originating device).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta's system/method by incorporating the steps of *identifying parameter values descriptive of the test packets received in the first data transmission, wherein the parameter values for each test packet comprise sequence number of the test packet; forming a second data transmission comprising sequence number for every covered test packets received* as suggested by Mawhinney. The motivation is that (as suggested by Mashinney, column 11 lines 45-60) a device on the receiving end will be instructed as to the pattern type and sequence, and thus will know the particular pattern and sequence of data that it expects to receive; It can then monitor the pattern data and sequence received over the diagnostic channel to verify whether that channel is, in fact, properly transmitting data; The accurate reception of data will indicate to the receiving unit that the transmission line defined by the circuit is in good and proper working order; Faulty data will be an indication that there is some type of error or system fault along or within the circuit. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

Malmivirta and Mawhinney do not explicitly teach observation interval for testing.

Brady in the similar field of endeavor teaches in column 4 lines 35-38, relay 48 includes a timer built therein which holds the relay in the loopback position for a predetermined period (interpreted as observation interval) of time during which suitable loopback tests may be performed.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta and Mawhinney's system/method by incorporating the steps of observation interval for testing as suggested by Brady. The motivation is that such interval limits that time in which tests can be performed leaving open other times for regular operation of the device. Further motivation is that generating and sending test packets at regular interval helps to diagnose a communication system very efficiently and effectively. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

Malmivirta, Mawhinney and Brady do not explicitly teach source address being part of the test packet.

Engbersen teaches (abstract) for detecting errors, the test information would include an input address indicating the source of the test packet, a sequence number defining the order in which the packet should arrive at the destination, time bits relating to the packet length and/or to the expected packet transmission delay, and a cyclic redundancy code which covers the entire contents of the test packet, including its control portion.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta, Mawhinney and Brady's system/method with the steps of source address being part of the test packet as suggested by Engbersen. The motivation is that such method enables analyzing entity at a receiving station

identify the sender accurately and reliably. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

In regards to claims 30, 31 and 39, Malmivirta teaches sending a first data transmission via a first channel, wherein the first data transmission comprises test packets of known test data (column 7 lines 40-45, columns 7-8 lines 58-8, As soon as the G loop has been closed the test equipment can start sending test data. Testing is preferably carried out such that the test equipment generates test bursts in which the information bits contain desired "raw data", i.e. bit combinations the reception of which is to be examined); receiving a second data transmission via a second channel, wherein the second data transmission includes parameter values descriptive of the test packets in the first data transmission received (column 8 lines 5-10, The test equipment receives the uplink bursts sent by the mobile station and demodulates and decrypts them so that the information bits in a received burst can be processed by the test equipment. To compute the bit error ratio (BER) the test equipment compares the received information bits to the raw data it sent to the mobile station). In regards to claim 39, Malmivirta teaches a memory communicatively coupled to a digital signal processing device (DSPD) (column 6 lines 57-59).

Malmivirta does not explicitly teach a record for each test packet correctly received.

Mawhinney in the similar field of endeavor teaches a record for each test packet correctly received (Figure 5 sequence number field, column 3 lines 38-53, column 11 lines 45-60, lines column 12 lines 1-15, column 4 lines 44-47).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta's system/method by incorporating the steps of a record for each test packet correctly received as suggested by Mawhinney. The motivation is that (as suggested by Mashinney, column 11 lines 45-60) a device on the receiving end will be instructed as to the pattern type and sequence, and thus will know the particular pattern and sequence of data that it expects to receive; It can then monitor the pattern data and sequence received over the diagnostic channel to verify whether that channel is, in fact, properly transmitting data; The accurate reception of data will indicate to the receiving unit that the transmission line defined by the circuit is in good and proper working order; Faulty data will be an indication that there is some type of error or system fault along or within the circuit. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

Malmivirta and Mawhinney do not explicitly teach observation interval for testing.

Brady in the similar field of endeavor teaches in column 4 lines 35-38, relay 48 includes a timer built therein which holds the relay in the loopback position for a predetermined period (interpreted as observation interval) of time during which suitable loopback tests may be performed.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta and Mawhinney's system/method by incorporating the steps of observation interval for testing as suggested by Brady. The motivation is that such interval limits that time in which tests can be performed leaving open other times for regular operation of the device. Further motivation is that generating and sending test packets at regular interval helps to diagnose a communication system very efficiently and effectively. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

Malmivirta and Mawhinney and Brady do not explicitly teach parameter values are configured to be used to update a plurality of variables employable in testing the one or more channels; updating a plurality of variables based on the parameter values included in a second data transmission; and determining a packet error rate based on information included in the second data transmission.

Engbersen teaches (abstract, column 19 lines 17-20) for detecting errors, the test information would include an input address indicating the source of the test packet, a sequence number defining the order in which the packet should arrive at the destination, time bits relating to the packet length and/or to the expected packet transmission delay, and a cyclic redundancy code which covers the entire contents of the test packet, including its control portion. Each analyzer at a receiving station operates autonomously from the senders and processes all received traffic in real-time;

this enables it to recognize all defined system errors, even those occurring with very low probability, at the packet level. Based on this information, the transputer either performs statistical computations (e.g. counting of the faulty events) (i.e. interpreted as updating varibles)). Further, regarding packet error rate, Engbersen teaches error detection is performed by analyzing the arriving packets at the output of the assumed fault path for unexpected contents.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Sakakura's system/method with the steps of parameter values are configured to be used to update a plurality of variables employable in testing the one or more channels; updating a plurality of variables based on the parameter values included in a second data transmission; and determining a packet error rate based on information included in the second data transmission as suggested by Engbersen. The motivation is that (as suggested by Engbersen, abstract) such method enables analyzer at a receiving station operates autonomously from the senders and processes all received traffic in real-time; this enables it to recognize all defined system errors, even those occurring with very low probability, at the packet level. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

10. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Malmivirta et al. (US PAT 6680913), hereinafter referred to as Malmivirta in view of

Mawhinney et al. (US PAT 5898674, hereinafter Mawhinney), Brady (US PAT 3922508), hereinafter referred to as Brady and Funk et al. (US PAT 6766164), hereinafter referred to as Funk.

Malmivirta, Mawhinney and Brady teach all the limitations of claim 6 above but do not explicitly teach test packet is formed for each particular time interval.

Funk in the same field of endeavor teaches test packets being formed for particular time interval (column 3 lines 61-67).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta, Mawhinney and Brady's method by incorporating one loop back packet being formed for each particular time interval as taught by Funk. The motivation is that generating and sending test packets at regular interval helps to diagnose a communication system very efficiently and effectively. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

11. Claims 40-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Malmivirta et al. (US PAT 6680913), hereinafter referred to as Malmivirta in view of Numminen (US PAT 5802105, hereinafter Tiedemann), Oommen et al. (US PAT 6799203) and Tiedemann et al. (US PAT 5802105, hereinafter Tiedemann).

In regards to claims 40-44 Malmivirta teaches receiving a plurality of test packets via a forward traffic channel (column 7 lines 40-45, columns 7-8 lines 58-8, As soon as

the G loop has been closed the test equipment can start sending test data. Testing is preferably carried out such that the test equipment generates test bursts in which the information bits contain desired "raw data", i.e. bit combinations the reception of which is to be examined. Functionally, data transmission and reception occur on the physical protocol level called Layer 1. When the G loop is closed the mobile station loops in principle the information bits of every burst received on the downlink data channel back to a certain uplink burst. It is here assumed bursty transmission. The same principle can easily be generalized to apply to a situation in which the transmission is continuous; this concerns especially the testing of mobile stations in systems utilizing the code division multiple access (CDMA) method. In the exemplary GSM system each burst has 114 information bits to loop back, excluding the so-called stealing flags. Preferably the loopback does not depend on the contents of the so-called midamble of the received downlink bursts. In uplink bursts the mobile station uses the midamble that it would use anyway. The test equipment receives the uplink bursts sent by the mobile station and demodulates and decrypts them so that the information bits in a received burst can be processed by the test equipment).

In regards to claims 40, 41, 42 and 43 Malmivirta does not explicitly teach collecting data for a first parameter while in idle state and not exchanging data via the link; collecting a second statistic for a second parameter different from the first parameter while in connected state and exchanging data via the link; receiving a first message requesting the first or second statistic, and sending a second message with the requested first or second statistic.

In regards to claims 40, 41, 42 and 43 Numminen teaches a method of collecting data for a first parameter while in idle state and not exchanging data via the link (column 10 lines 1-8, In addition to the testing described above the invention is applicable when a mobile station or a terminal of a cellular radio system in general is in normal use, i.e. moving with its user within the area of the cellular radio system. Then it is for most of the time in the so-called idle mode (i.e. idle state) in which it receives from base stations certain downlink messages and sends occasionally location update messages (i.e. collecting data for a first parameter "location area") uplink. The cellular radio system knows at all times the location of every idling mobile station (i.e. first statistics being transmitted data of "location area" for every idling mobile station) with the accuracy of a so-called location area (LA) at least). Numminen teaches collecting a second statistic for a second parameter different from the first parameter while in connected state and exchanging data via the link (column 7 lines 46-47 and column 7 lines 59-61, column 9 lines 10-11 and column 8 lines 29-39, while the G loop is active the mobile station compares the received bit sequence portions to the locally produced portions and measures e.g. the bit error ratio or frame erasure ratio and compiles statistics of the measurement results in a desired manner. Complete statistics or information elements representing the reception error status in general are sent uplink to the test equipment. At first the test equipment sends a comparison and statistical operation start command associated with the data channel. The mobile station activates the test loop in a certain time after it has sent the acknowledge). Numminen teaches receiving a first message requesting the first or second statistic, and sending a second message with the

requested first or second statistic (column 8 lines 29-39, while the G loop is active the mobile station compares the received bit sequence portions to the locally produced portions and measures e.g. the bit error ratio or frame erasure ratio and compiles statistics of the measurement results in a desired manner. Complete statistics or information elements representing the reception error status in general are sent uplink to the test equipment).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta's teaching by incorporating the steps of collecting data for a first parameter while in idle state and not exchanging data via the link; collecting a second statistic for a second parameter different from the first parameter while in connected state and exchanging data via the link; receiving a first message requesting the first or second statistic, and sending a second message with the requested first or second statistic as suggested by Numminen. The motivation is that by collecting statistics real-time while testing is being performed enables a reliable and up-to-date statistic collection process to check network reliability. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

In regards to claims 40-43 Numminen does not explicitly teach, collecting statistics during each of the transactions.

Oommen in the same field of endeavor teaches (column 2 lines 46-49) OTAMD involves requesting statistics and performing diagnostic tests in the MS using a command issued from the network for testing purpose.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Numminen's teaching by incorporating the statistic gathering during transactions as taught by Oommen. The motivation is that by collecting statistics real-time while testing is being performed enables a reliable and up-to-date statistic collection process to check network reliability. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

In regards to claims 40 and 44, Malmivirta, Numminen and Oommen do not explicitly teach collecting the first statistic occurs while performing testing.

Tiedemann in the same field of endeavor teaches collecting the first statistic occurs while performing testing function (column 14 lines 40-57).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta, Numminen and Oommen's teaching by incorporating the steps of collecting the first statistic occurs while performing testing as taught by Oommen. The motivation is that by collecting statistics real-time while testing is being performed enables a reliable and up-to-date statistic collection process to check network reliability. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other

market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

In regards to claim 44, Malmivirta teaches a memory communicatively coupled to a digital signal processing device (DSPD) (column 6 lines 57-59).

12. Claims 45 and 56, are rejected under 35 U.S.C. 103(a) as being unpatentable over Malmivirta et al. (US PAT 6680913), hereinafter referred to as Malmivirta in view of Tiedemann.

In regards to claim 45 and 56 Malmivirta teaches receiving a plurality of test packets via a forward traffic channel (column 7 lines 40-45, columns 7-8 lines 58-8, As soon as the G loop has been closed the test equipment can start sending test data. Testing is preferably carried out such that the test equipment generates test bursts in which the information bits contain desired "raw data", i.e. bit combinations the reception of which is to be examined. Functionally, data transmission and reception occur on the physical protocol level called Layer 1. When the G loop is closed the mobile station loops in principle the information bits of every burst received on the downlink data channel back to a certain uplink burst. It is here assumed bursty transmission. The same principle can easily be generalized to apply to a situation in which the transmission is continuous; this concerns especially the testing of mobile stations in systems utilizing the code division multiple access (CDMA) method. In the exemplary GSM system each burst has 114 information bits to loop back, excluding the so-called stealing flags. Preferably the loopback does not depend on the contents of the so-called

midamble of the received downlink bursts. In uplink bursts the mobile station uses the midamble that it would use anyway. The test equipment receives the uplink bursts sent by the mobile station and demodulates and decrypts them so that the information bits in a received burst can be processed by the test equipment).

Malmivirta does not explicitly teach selecting rates for the test packets based on a set of rules for rate selection scheme, and transmitting the test packets at the selected rates on the traffic channel. Malmivirta does not explicitly teach the plurality of test packets comprising information for a plurality of rates being tested for the traffic channel.

Tiedemann in the same field of endeavor teaches the system allows the test sequence of digital data to be transmitted at one of a set of known data rates, with the receive station being disposed to identify the data rate associated with each test sequence of digital data. In a preferred implementation transmission of the test sequence involves generating a first plurality of data packets, which collectively comprise the test sequence of digital data. Each data packet is assigned one of a multiplicity of data rates in accordance with a first pseudorandom process, and is then transmitted at the data rate assigned thereto (abstract). Tiedemann in the same field of endeavor teaches plurality of test packets comprising information for a plurality of rates being tested for the traffic channel (column 9 lines 30-33 and TABLE II, Referring now to TABLE II, there are listed the number of bits included within the sequences comprising a set of exemplary data packets transmitted at various data rates).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta's teaching by incorporating the steps of selecting rates for the test packets based on a set of rules for rate selection scheme, and transmitting the test packets at the selected rates on the traffic channel. The motivation is that The motivation is that by testing communication link at various data rates a node can get an accurate picture of the current condition of the link; thus enabling it to modify, most efficiently and reliably, link parameters related to rates to enable seamless communication. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

13. Claim 49 is rejected under 35 U.S.C. 103(a) as being unpatentable over Malmivirta and Tiedemann as applied to claim 45 above and further in view of Numminen.

In regards to claim 49 Malmivirta and Tiedemann teach a testing system as described in the rejections of claim 45 above.

Malmivirta and Tiedemann do not explicitly teach of message includes an indication of maintenance of a test mode on the traffic channel in event of a connection closure or a lost connection.

Numminen in the same or similar field of endeavor teaches message includes an indication of maintenance of a test mode on the traffic channel in event of a connection

closure or a lost connection (column 7 lines 18-20, So test mode means that the mobile station to be tested is instructed to maintain a connection' on a certain transmission channel. The mobile station is kept in the test mode by Layer 3 signaling).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta and Tiedemann's teaching by incorporating message includes an indication of maintenance of a test mode on the traffic channel in event of a connection closure or a lost connection as suggested by Numminen. The motivation is that such method enables a system to designate and maintain a non-used channel for testing purpose; thus making efficient use of the channel resources. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

14. Claims 50-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Malmivirta and Tiedemann as applied to claim 45 above and further in view of Kobayasi.

In regards to claims 50-52 Malmivirta and Tiedemann teaches a testing system as described in the rejections of claim 45 above.

In regards to claims 50-52 Malmivirta and Tiedemann do not explicitly teach of having protocol type, packet type, number of records field, time interval, source address, sequence number in the test packet. In regards to claim 58 Malmivirta does not explicitly teach a queue for the test packets.

In regards to claims 50 and 51 Kobayasi discloses protocol type, packet type, number of records field, time interval, source address, sequence number in the packets shown in FIGS. 582 through 628. In regards to claim 52 Kobayasi teaches (column 3 lines 5-10) that since the source SW station 3 and the terminal SW station 6 mark the time stamp onto the payload field of the packet, the OS center 1 is informed of the transmission time of packets according to the information. In regards to claim 58, 62 and 65 Kobayasi teaches buffers (fig 132) for data packets.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta and Tiedemann's teaching by incorporating the loopback test scheme as taught by Kobayasi. The motivation is that (as suggested by Kobayasi column 317 lines 29-34) the present invention realizes an efficient test within a short time by performing a test cell loopback check, which has been made in a test device, through a test program in the switch. Additionally, transmitting cell data from a test device requires no testing units because the loopback jig can replace the testing units. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

In regards to claim 53, Malmivirta and Tiedemann do not explicitly teach field indicative of whether any loop back packets were lost due to buffer overflow.

Kobayasi in the same field of endeavor teaches, (column 2 lines 55-67) a test being started by issuing a test connectionless packet transmission request message

(test start request) from the OS center 1 to SW station 3. The request message contains an identification information ID indicating terminal SW station 6. SW station 3 generates a test packet with the identification address of terminal SW station 6 set as its destination address DA and the identification address of its home station (SW station 3) set as its source address SA. The test packet is output to terminal SW station 6. In SW stations 4 and 5, test packets are processed as normal packets and transferred to terminal SW station 6. On receipt of the test packet, terminal SW station 6 outputs the packet with its DA and SA inverted. That is, the packet is returned from terminal SW station 6 to SW station 3, and it is reported to the OS center 1 upon re-arrival of the packet at the source SW station 3. Kobayasi further teaches the L2-PDU shown in FIG. 783 is an example of a BOM cell. The 2 bytes preceded by the header field stores a segment type ST, sequence number SN, and message identifier MID (or a multiplex identifier). The sequence number SN is a serial number assigned to a transferred cell for convenience in detecting the cell if it is lost or mistakenly inserted.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta and Tiedemann's system/method by incorporating the steps of having source id and sequence number in test packets as taught by Kobayasi. The motivation is that having a source and sequence number enables a system to easily and efficiently identify the source of the test packets and number of packets received or lost due to overflow for statistical record keeping. Known work in one field of endeavor may prompt variations of it for use in either the same field

or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

15. Claims 46-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Malmivirta and Tiedmann as applied to claim 45 above, and further in view of Ikeda (US PAT 5636212).

In regards to claims 46 and 47 Malmivirta and Tiedmann teach a method for testing one or more channels in a wireless data communication system as described in the rejections of claim 45 above.

Malmivirta and Tiedmann do not explicitly teach message having maximum and minimum rate for rate selection.

Ikeda in the same field of endeavor teaches (column 8 lines 38-39) reservation request being issued with a maximum band-width and a minimum band-width.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta and Tiedmann's system/method by incorporating the concept of sending maximum band-width and a minimum band-width via message as taught by Ikeda. The motivation is that (as suggested by Ikeda, column 2 lines 5-10) to provide a flexible method of reserving a band-width for a burst capable of flexibly reserving a band-width according to a maximum band-width and a minimum band-width requested for reservation. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design

incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

In regards to claim 48, Malmivirta and Tiedmann do not explicitly teach with the steps of the selected rates for the test packets being further limited by a maximum rate specified by a media access control (MAC) protocol

It would have been obvious of one of ordinary skill in the art at the time of invention to modify Malmivirta and Tiedmann's system/method with the steps of the selected rates for the test packets being further limited by a maximum rate specified by a media access control (MAC) protocol; as a link defined to have a maximum bandwidth rate cannot operate in a higher bandwidth which may cause overflow of data in buffers and in result cause loss of packets. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

16. Claims 57 and 58, are rejected under 35 U.S.C. 103(a) as being unpatentable over Malmivirta, in view of Tiedemann, Kobayasi, Ikeda and and Sjoblom (US PAT PUB 2002/0009053).

In regards to claim 57 and 58 Malmivirta teaches receiving a plurality of test packets via a forward traffic channel (column 7 lines 40-45, columns 7-8 lines 58-8, As soon as the G loop has been closed the test equipment can start sending test data. Testing is preferably carried out such that the test equipment generates test bursts in

which the information bits contain desired "raw data", i.e. bit combinations the reception of which is to be examined. Functionally, data transmission and reception occur on the physical protocol level called Layer 1. When the G loop is closed the mobile station loops in principle the information bits of every burst received on the downlink data channel back to a certain uplink burst. It is here assumed bursty transmission. The same principle can easily be generalized to apply to a situation in which the transmission is continuous; this concerns especially the testing of mobile stations in systems utilizing the code division multiple access (CDMA) method. In the exemplary GSM system each burst has 114 information bits to loop back, excluding the so-called stealing flags. Preferably the loopback does not depend on the contents of the so-called midamble of the received downlink bursts. In uplink bursts the mobile station uses the midamble that it would use anyway. The test equipment receives the uplink bursts sent by the mobile station and demodulates and decrypts them so that the information bits in a received burst can be processed by the test equipment).

Malmivirta does not explicitly teach selecting rates for the test packets based on a set of rules for rate selection scheme, and transmitting the test packets at the selected rates on the traffic channel.

Tiedemann in the same field of endeavor teaches the system allows the test sequence of digital data to be transmitted at one of a set of known data rates, with the receive station being disposed to identify the data rate associated with each test sequence of digital data. In a preferred implementation transmission of the test sequence involves generating a first plurality of data packets, which collectively

comprise the test sequence of digital data. Each data packet is assigned one of a multiplicity of data rates in accordance with a first pseudorandom process, and is then transmitted at the data rate assigned thereto (abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta's teaching by incorporating the steps of selecting rates for the test packets based on a set of rules for rate selection scheme, and transmitting the test packets at the selected rates on the traffic channel. The motivation is that The motivation is that by testing communication link at various data rates a node can get an accurate picture of the current condition of the link; thus enabling it to modify, most efficiently and reliably, link parameters related to rates to enable seamless communication. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

Malmivirta and Tiedemann do not explicitly teach identifying a transmission source of each received test packet; wherein packet includes the transmission source of each covered test packet. Malmivirta and Tiedemann do not explicitly teach selecting rates for the test packets based on a rate selection scheme. In regards to claim 58 Malmivirta does not explicitly teach a queue for the test packets.

Kobayasi in the same field of endeavor teaches, (column 2 lines 55-67) a test being started by issuing a test connectionless packet transmission request message (test start request) from the OS center 1 to SW station 3. The request message

contains an identification information ID indicating terminal SW station 6. SW station 3 generates a test packet with the identification address of terminal SW station 6 set as its destination address DA and the identification address of its home station (SW station 3) set as its source address SA. The test packet is output to terminal SW station 6. In SW stations 4 and 5, test packets are processed as normal packets and transferred to terminal SW station 6. On receipt of the test packet, terminal SW station 6 outputs the packet with its DA and SA inverted. That is, the packet is returned from terminal SW station 6 to SW station 3, and it is reported to the OS center 1 upon re-arrival of the packet at the source SW station 3. Kobayasi teaches (column 97 lines 45-46) Loopback of a test cell is done in a 156 Mbps cell highway. Kobayasi discloses protocol type, packet type, number of records field, time interval, source address, sequence number in the packets shown in FIGS. 582 through 628. Kobayasi teaches (column 3 lines 5-10) that since the source SW station 3 and the terminal SW station 6 mark the time stamp onto the payload field of the packet, the OS center 1 is informed of the transmission time of packets according to the information.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta's teaching by incorporating the loopback test scheme as taught by Kobayasi. The motivation is that (as suggested by Kobayasi column 317 lines 29-34) the present invention realizes an efficient test within a short time by performing a test cell loopback check, which has been made in a test device, through a test program in the switch. Additionally, transmitting cell data from a test device requires no testing units because the loopback can replace the testing units.

Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

In regards to claim 57 Malmivirta, Tiedemann and Kobayasi do not explicitly teach message having maximum and minimum rate for rate selection.

Ikeda in the same field of endeavor teaches (column 8 lines 38-39) reservation request being issued with a maximum band-width and a minimum band-width.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta, Tiedemann and Kobayasi's system/method by incorporating the concept of sending maximum band-width and a minimum band-width via message as taught by Ikeda. The motivation is that (as suggested by Ikeda, column 2 lines 5-10) to provide a flexible method of reserving a band-width for a burst capable of flexibly reserving a band-width according to a maximum band-width and a minimum band-width requested for reservation. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

Malmivirta, Tiedemann, Kobayasi and Ikeda do not explicitly teach identifying sequence number in test packets and forming test packets including the sequence number.

Sjoblom in the same field of endeavor teaches identifying sequence number in test packets and forming test packets including the sequence number (paragraphs 0023 and 0026).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta, Tiedemann, Kobayasi and Ikeda's teaching by incorporating the steps of identifying sequence number in test packets and forming test packets including the sequence number as suggested by Sjoblom. The motivation is that the sequence number SN is a serial number assigned to a transferred cell for convenience in detecting the cell if it is lost or mistakenly inserted; thus enabling a reliable communication. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

17. Claim 59 is rejected under 35 U.S.C. 103(a) as being unpatentable over Malmivirta in view of Tiedemann.

In regards to claim 59 Malmivirta teaches sending a first message having included therein test settings selected for the reverse traffic channel (column 7 lines 40-45, columns 7-8 lines 58-8, As soon as the G loop has been closed the test equipment can start sending test data. Testing is preferably carried out such that the test equipment generates test bursts in which the information bits contain desired "raw data", i.e. bit combinations the reception of which is to be examined. Functionally, data

transmission and reception occur on the physical protocol level called Layer 1. When the G loop is closed the mobile station loops in principle the information bits of every burst received on the downlink data channel back to a certain uplink burst. It is here assumed bursty transmission. The same principle can easily be generalized to apply to a situation in which the transmission is continuous; this concerns especially the testing of mobile stations in systems utilizing the code division multiple access (CDMA) method. In the exemplary GSM system each burst has 114 information bits to loop back, excluding the so-called stealing flags. Preferably the loopback does not depend on the contents of the so-called midamble of the received downlink bursts. In uplink bursts the mobile station uses the midamble that it would use anyway. The test equipment receives the uplink bursts sent by the mobile station and demodulates and decrypts them so that the information bits in a received burst can be processed by the test equipment); receiving a plurality of test packets on the traffic channel and determining a packet error based on information included in plurality of test packets (column 7 lines 58-60, column 8 lines 5-15, when the G loop is closed the mobile station loops in principle the information bits of every burst received on the downlink data channel back to a certain uplink burst. The test equipment receives the uplink bursts sent by the mobile station and demodulates and decrypts them so that the information bits in a received burst can be processed by the test equipment. To compute the bit error ratio (BER) the test equipment compares the received information bits to the raw data it sent to the mobile station. The signal level at which the downlink bursts are delivered to the terminal equipment is variable so that the bit error ratio observed by the

test equipment describes the sensitivity of the receiver in the mobile station especially at low signal levels).

Malmivirta does not explicitly teach receiving a plurality of test packets, the plurality of test packets comprising information for plurality of rates being tested and updating a plurality of variables maintained for a plurality of rates based on the rates of the received test packets. Malmivirta does not explicitly teach determining a packet error based on the information included in plurality of test packets for the plurality of rates.

Tiedemann in the same field of endeavor teaches updating a plurality of variables maintained for the plurality of rates based on the rates of the received test packets (column 14 lines 40-57). Tiedemann in the same field of endeavor teaches receiving a plurality of test packets at a plurality of rates (abstract, Each data packet is assigned one of a multiplicity of data rates in accordance with a first pseudorandom process, and is then transmitted at the data rate assigned thereto), the plurality of test packets comprising information for plurality of rates being tested (column 9 lines 30-33 and TABLE II, Referring now to TABLE II, there are listed the number of bits included within the sequences comprising a set of exemplary data packets transmitted at various data rates). Tiedemann in the same field of endeavor teaches determining a packet error based on the information included in plurality of test packets for the plurality of rates (column 10 lines 36-44, Subsequent to identification of the data rate associated with a particular received frame, the test data replication circuit 50 supplies a locally-generated packet of test data of the appropriate type to the digital comparator 49. Specifically, a

frame category indicative of either a Rate 1, Rate 1/2, Rate 1/4, Rate 1/8, Blank, Rate 1 with Bit Error or an Insufficient Frame Quality is provided by the circuit 50 to comparator 49).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta's system/method by incorporating the steps of receiving a plurality of test packets at a plurality of rates, the plurality of test packets comprising information for plurality of rates being tested and updating a plurality of variables maintained for the plurality of rates based on the rates of the received test packets and determining a packet error based on the information included in plurality of test packets for the plurality of rates as suggested by Tiedemann. The motivation is that by updating various variables related to communication link status, a node keeps an up-to-date information of the current condition of the links; thus enabling it to modify, most efficiently and reliably, link parameters to enable seamless communication. Further motivation is that by testing communication link at various data rates a node can get an accurate picture of the current condition of the link; thus enabling it to modify, most efficiently and reliably, link parameters related to rates to enable seamless communication. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

18. Claim 60 is rejected under 35 U.S.C. 103(a) as being unpatentable over Malmivirta and Tiedemann in view of Engbersen (US PAT 5271000, hereinafter Engbersen).

In regards to claim 60, Malmivirta and Tiedemann teach all the limitations of claim 59 above but do not explicitly teach updating a first variable based on a sequence number of the test packet.

Engbersen teaches (abstract, column 19 lines 17-20) for detecting errors, the test information would include an input address indicating the source of the test packet, a sequence number defining the order in which the packet should arrive at the destination, time bits relating to the packet length and/or to the expected packet transmission delay, and a cyclic redundancy code which covers the entire contents of the test packet, including its control portion. Each analyzer at a receiving station operates autonomously from the senders and processes all received traffic in real-time; this enables it to recognize all defined system errors, even those occurring with very low probability, at the packet level. Based on this information, the transputer either performs statistical computations (e.g. counting of the faulty events) (i.e. interpreted as updating varibles)). Further, regarding packet error rate, Engbersen teaches error detection is performed by analyzing the arriving packets at the output of the assumed fault path for unexpected contents.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta and Tiedemann's system/method with the steps of updating a first variable based on a sequence number of the test packet as

suggested by Engbersen. The motivation is that such method enables a receiver to recognize all defined transmission errors and calculate for further analysis. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

19. Claims 61-63, 65, 67 and 68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Malmivirta, in view of Kobayasi et al. (US PAT 6333932), hereinafter referred to as Kobayasi, Sjoblom (US PAT PUB 2002/0009053) and Brady.

In regards to claims 61-63, 67 and 68 Malmivirta teaches receiving a plurality of test packets of known test data via a forward traffic channel, forming a plurality of loop back packets covering all test packets received test packets (column 7 lines 40-45, columns 7-8 lines 58-8, As soon as the G loop has been closed the test equipment can start sending test data. Testing is preferably carried out such that the test equipment generates test bursts in which the information bits contain desired "raw data", i.e. bit combinations the reception of which is to be examined. Functionally, data transmission and reception occur on the physical protocol level called Layer 1. When the G loop is closed the mobile station loops in principle the information bits of every burst received on the downlink data channel back to a certain uplink burst. It is here assumed bursty transmission. The same principle can easily be generalized to apply to a situation in which the transmission is continuous; this concerns especially the testing of mobile stations in systems utilizing the code division multiple access (CDMA) method. In the

exemplary GSM system each burst has 114 information bits to loop back, excluding the so-called stealing flags. Preferably the loopback does not depend on the contents of the so-called midamble of the received downlink bursts. In uplink bursts the mobile station uses the midamble that it would use anyway. The test equipment receives the uplink bursts sent by the mobile station and demodulates and decrypts them so that the information bits in a received burst can be processed by the test equipment); and transmitting the loop back packets via reverse traffic channel (column 7 lines 58-60, when the G loop is closed the mobile station loops in principle the information bits of every burst received on the downlink data channel back to a certain uplink burst). In regards to claims 63, 67 and 68 Malmivirta further teaches data transmission comprises data for determining a packet error (column 8 lines 5-10, The test equipment receives the uplink bursts sent by the mobile station and demodulates and decrypts them so that the information bits in a received burst can be processed by the test equipment. To compute the bit error ratio (BER) the test equipment compares the received information bits to the raw data it sent to the mobile station).

Malmivirta does not explicitly teach identifying a transmission source of each received packet; includes the transmission source of every covered test packet and forming a plurality of loop back packets includes the source number of every covered test packet. In regards to claim 62 and 65 Malmivirta does not explicitly teach a queue for the test packets.

Kobayasi in the same field of endeavor teaches, (column 2 lines 55-67) a test being started by issuing a test connectionless packet transmission request message

(test start request) from the OS center 1 to SW station 3. The request message contains an identification information ID indicating terminal SW station 6. SW station 3 generates a test packet with the identification address of terminal SW station 6 set as its destination address DA and the identification address of its home station (SW station 3) set as its source address SA (i.e. transmission source). The test packet is output to terminal SW station 6. In SW stations 4 and 5, test packets are processed as normal packets and transferred to terminal SW station 6. On receipt of the test packet, terminal SW station 6 outputs the packet with its DA and SA inverted (satisfying the forming step). That is, the packet is returned from terminal SW station 6 to SW station 3, and it is reported to the OS center 1 upon re-arrival of the packet at the source SW station 3. Kobayasi teaches (column 97 lines 45-46) Loopback of a test cell is done in a 156 Mbps cell highway. In regards to claims 62 and 65 Kobayasi teaches buffers (fig 132) for data packets.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta's teaching by incorporating the loopback test scheme as taught by Kobayasi. The motivation is that (as suggested by Kobayasi column 317 lines 29-34) the present invention realizes an efficient test within a short time by performing a test cell loopback check, which has been made in a test device, through a test program in the switch. Additionally, transmitting cell data from a test device requires no testing units because the loopback jig can replace the testing units. Known work in one field of endeavor may prompt variations of it for use in either the

same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

Malmivirta and Kobayasi do not explicitly teach identifying sequence number in test packets and forming test packets including the sequence number.

Sjoblom in the same field of endeavor teaches identifying sequence number in test packets and forming test packets including the sequence number (paragraphs 0023 and 0026).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta and Kobayasi's teaching by incorporating the steps of identifying sequence number in test packets and forming test packets including the sequence number as suggested by Sjoblom. The motivation is that the sequence number SN is a serial number assigned to a transferred cell for convenience in detecting the cell if it is lost or mistakenly inserted; thus enabling a reliable communication. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

Malmivirta and Kobayasi do not explicitly teach observation interval for testing.

Brady in the similar field of endeavor teaches in column 4 lines 35-38, relay 48 includes a timer built therein which holds the relay in the loopback position for a predetermined period (interpreted as observation interval) of time during which suitable loopback tests may be performed.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta and Kobayasi's system/method by incorporating the steps of observation interval for testing as suggested by Brady. The motivation is that such interval limits that time in which tests can be performed leaving open other times for regular operation of the device. Further motivation is that generating and sending test packets at regular interval helps to diagnose a communication system very efficiently and effectively. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

In regards to claims 61 and 67 Malmivirta teaches a receive data processor (figure 3 elements 303 and 304 combined), a transmit data processor (figure 3 elements 310 and 311 combined) and a controller (figure 3 element 307).

20. Claims 64 and 66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Malmivirta, in view of Tiedemann, Kobayasi, ikeda and and Sjoblom (US PAT PUB 2002/0009053).

In regards to claim 64 and 66 Malmivirta teaches receiving a plurality of test packets via a forward traffic channel (column 7 lines 40-45, columns 7-8 lines 58-8, As soon as the G loop has been closed the test equipment can start sending test data. Testing is preferably carried out such that the test equipment generates test bursts in which the information bits contain desired "raw data", i.e. bit combinations the reception

of which is to be examined. Functionally, data transmission and reception occur on the physical protocol level called Layer 1. When the G loop is closed the mobile station loops in principle the information bits of every burst received on the downlink data channel back to a certain uplink burst. It is here assumed bursty transmission. The same principle can easily be generalized to apply to a situation in which the transmission is continuous; this concerns especially the testing of mobile stations in systems utilizing the code division multiple access (CDMA) method. In the exemplary GSM system each burst has 114 information bits to loop back, excluding the so-called stealing flags. Preferably the loopback does not depend on the contents of the so-called midamble of the received downlink bursts. In uplink bursts the mobile station uses the midamble that it would use anyway. The test equipment receives the uplink bursts sent by the mobile station and demodulates and decrypts them so that the information bits in a received burst can be processed by the test equipment).

Malmivirta does not explicitly teach selecting rates for the test packets based on a set of rules for rate selection scheme, and transmitting the test packets at the selected rates on the traffic channel.

Tiedemann in the same field of endeavor teaches the system allows the test sequence of digital data to be transmitted at one of a set of known data rates, with the receive station being disposed to identify the data rate associated with each test sequence of digital data. In a preferred implementation transmission of the test sequence involves generating a first plurality of data packets, which collectively comprise the test sequence of digital data. Each data packet is assigned one of a

multiplicity of data rates in accordance with a first pseudorandom process, and is then transmitted at the data rate assigned thereto (abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta's teaching by incorporating the steps of selecting rates for the test packets based on a set of rules for rate selection scheme, and transmitting the test packets at the selected rates on the traffic channel as suggested by Tiedemann. The motivation is that The motivation is that by testing communication link at various data rates a node can get an accurate picture of the current condition of the link; thus enabling it to modify, most efficiently and reliably, link parameters related to rates to enable seamless communication. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

Malmivirta and Tiedemann do not explicitly teach test packets having transmission source.

Kobayasi in the same field of endeavor teaches, (column 2 lines 55-67) a test being started by issuing a test connectionless packet transmission request message (test start request) from the OS center 1 to SW station 3. The request message contains an identification information ID indicating terminal SW station 6. SW station 3 generates a test packet with the identification address of terminal SW station 6 set as its destination address DA and the identification address of its home station (SW station 3) set as its source address SA. The test packet is output to terminal SW station 6. In SW

stations 4 and 5, test packets are processed as normal packets and transferred to terminal SW station 6. On receipt of the test packet, terminal SW station 6 outputs the packet with its DA and SA inverted. That is, the packet is returned from terminal SW station 6 to SW station 3, and it is reported to the OS center 1 upon re-arrival of the packet at the source SW station 3.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta and Tiedemann's system/method by incorporating the steps of having source id in test packets as taught by Kobayasi. The motivation is that having a source and sequence number enables a system to easily and efficiently identify the source of the test packets and number of packets received for statistical record keeping. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

Malmivirta, Tiedemann and Kobayasi does not explicitly teach message having maximum and minimum rate for rate selection

Ikeda in the same field of endeavor teaches (column 8 lines 38-39) reservation request being issued with a maximum band-width and a minimum band-width.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta, Tiedemann and Kobayasi's system/method by incorporating the concept of sending maximum band-width and a minimum band-width via message as taught by Ikeda. The motivation is that (as suggested by Ikeda,

column 2 lines 5-10) to provide a flexible method of reserving a band-width for a burst capable of flexibly reserving a band-width according to a maximum band-width and a minimum band-width requested for reservation. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

Malmivirta, Tiedemann, Kobayasi and Ikeda do not explicitly teach identifying sequence number in test packets and forming test packets including the sequence number.

Sjoblom in the same field of endeavor teaches identifying sequence number in test packets and forming test packets including the sequence number (paragraphs 0023 and 0026).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Malmivirta, Tiedemann, Kobayasi and Ikeda's teaching by incorporating the steps of identifying sequence number in test packets and forming test packets including the sequence number as suggested by Sjoblom. The motivation is that the sequence number SN is a serial number assigned to a transferred cell for convenience in detecting the cell if it is lost or mistakenly inserted; thus enabling a reliable communication. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

In regards to claim 64 Malmivirta teaches a receive data processor (figure 3 elements 303 and 304 combined), a transmit data processor (figure 3 elements 310 and 311 combined) and a controller (figure 3 element 307).

Allowable Subject Matter

21. Claims 14-23, 54 and 55 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

22. Applicant's arguments see pages 18-35 of the Remarks section, filed 2/23/2010, with respect to the rejections of the claims have been fully considered, but are not persuasive.

In response to applicant's argument (page 19) that the examiner has combined an excessive number of references, reliance on a large number of references in a rejection does not, without more, weigh against the obviousness of the claimed invention. See In re Gorman, 933 F.2d 982, 18 USPQ2d 1885 (Fed. Cir. 1991).

Claims 1, 5 and 32:

Applicant argues that (pages 20-21) the prior art does not teach "configuring the one or more channels based on the selected tests settings in the first message..."; cited passages say nothing about configuring channels based on test settings. Test bursts are transmitted, and loopback does not depend on contents of the "midamble" of received downlink bursts. Nowhere in this passage, or anywhere in Malmivirta, is the

concept of configuring channels based on test settings in a message. Applicants therefore submit that claims 1, 5, and 32 are not obvious in view of the cited references, alone or in combination, as they are missing a limitation included in claims 1, 5, and 32.

However, Examiner respectfully disagrees with Applicant's assertion. Malmivirta does indeed teach the cited limitations. Specifically, Malmivirta teaches a first message having included therein test settings (column 7 lines 11-13, First, the test equipment sends a test loop closing command <u>(i.e. first message being CLOSE_Multi-slot_loop_CMD)</u> related to the data channel, which command can be called CLOSE_Multi-slot_loop_CMD. The closing command may include an identifier <u>(i.e. identifier being the test settings)</u> on the basis of which the mobile station knows that the loop is a G loop); configuring the one or more channels based on the selected test settings in the first message (column 7 lines 40-45, columns 7-8 lines 58-8, As soon as the G loop has been closed <u>(i.e. closing of G loop is interpreted as configuring step)</u> the test equipment can start sending test data).

<u>Claims 6 and 28:</u>

Applicant argues that (see pages 22-23) prior art does not teach *forming a second data transmission comprising the identified parameter values for all test packets received.*

However, Examiner respectfully disagrees with Applicant's assertion. Hawhinney does indeed teach the cited limitations. Specifically, Mawhinney teaches when loopback is active on a virtual circuit, <u>all</u> frames received on the diagnostic channel of that circuit are transmitted back to the originating device. The originating device, then, after

transmitting a pattern, will monitor the diagnostic channel to evaluate whether the transmitted packet is in fact received. By monitoring the integrity of the received, loopbacked results, the transmitting device can evaluate the condition of the virtual circuit. In keeping within the description of FIG. 5, a sequence number (i.e. identified parameter values) will typically be utilized for tests in which sequence checking is required. In addition to the errors depicted in FIGS. 6A and 6B, errors could also be diagnosed if the pattern received by the receiving device (FIG. 6A embodiment) did not correlate with the expected pattern. Examiner submits, the current claim language is broad and in view of the broadest reasonable interpretation of the claim language the cited reference does indeed teach the cited limitations.

Applicant argues that (see page 22) the Brady design shows an interval during which loopback testing occurs, with a switch turned on at the beginning of the interval and turned off at the end of the interval: "Relay 48 includes a timer built therein which holds the relay in the loopback position for a predetermined period of time during which suitable loopback tests may be performed." This has nothing to do with the limitations claimed of first data transmission being received, parameters extracted, and a second transmission being formed including identified parameter values for "all" test packets received during an observation interval.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208

USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

<u>Claims 29-31 and 39:</u>

Applicant argues that (page 23) Formation of loop back packets "wherein each loop back packet ... includes the transmission source and the sequence number of every covered test packet received during the observation interval" is not shown by Mawhinney and/or Brady, alone or in combination. These references either send received packets back verbatim (Mawhinney) or provide a time period where loop back occurs, irrespective of a relationship between the time period and test packets. Thus the amended claim 29 is not obvious based on the cited references, alone or in combination. The same can be said of claims 30, 31, and 39.

However, Examiner respectfully disagrees with Applicant's assertion. The cited prior art do indeed teach the cited limitations. Specifically, Mawhinney in the similar field of endeavor teaches *forming a second data transmission comprising sequence number for test packets received* (<u>Figure 5 sequence number field</u>, column 3 lines 38-53, column 11 lines 45-60, lines column 12 lines 1-15, column 4 lines 44-47, In keeping within the description of FIG. 5, a <u>sequence number</u> will typically be utilized for tests in which sequence checking is required. A loopback test is typically run in conjunction with a send pattern and/monitor pattern command. When loopback is active on a virtual circuit, all frames received on the diagnostic channel of that circuit are transmitted <u>(i.e. after forming)</u> back to the originating device. The originating device, then, after transmitting a pattern, will monitor the diagnostic channel to evaluate whether the

transmitted packet is in fact received. By monitoring the integrity of the received, loopbacked results, the transmitting device can evaluate the condition of the virtual circuit. In keeping within the description of FIG. 5, a sequence number will typically be utilized for tests in which sequence checking is required. In addition to the errors depicted in FIGS. 6A and 6B, errors could also be diagnosed if the pattern received by the receiving device (FIG. 6A embodiment) did not correlate with the expected pattern. A device on the receiving end will be instructed as to the pattern type and sequence, and thus will know the particular pattern and sequence of data that it expects to receive. It can then monitor the pattern data and sequence received over the diagnostic channel to verify whether that channel is, in fact, properly transmitting data. The accurate reception of data will indicate to the receiving unit that the transmission line defined by the virtual circuit is in good and proper working order. Faulty data will be an indication that there is some type of error or system fault along or within the virtual circuit. A loopback test is typically run in conjunction with a send pattern and/monitor pattern command. When loopback is active on a virtual circuit, all frames received on the diagnostic channel of that circuit are transmitted (i.e. after forming) back to the originating device). Malmivirta and Mawhinney do not explicitly teach observation interval for testing. Brady in the similar field of endeavor teaches in column 4 lines 35-38, relay 48 includes a timer built therein which holds the relay in the loopback position for a predetermined period (interpreted as observation interval) of time during which suitable loopback tests may be performed. Malmivirta, Mawhinney and Brady do not explicitly teach source address being part of the test packet. Engbersen teaches

(abstract) for detecting errors, the test information would include an input address indicating the source of the test packet, a sequence number defining the order in which the packet should arrive at the destination, time bits relating to the packet length and/or to the expected packet transmission delay, and a cyclic redundancy code which covers the entire contents of the test packet, including its control portion. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Claims 61, 63, 67 and 68:

Applicant argues that (page 24) in short, as discussed and as is true for these cited references, none of these references, alone or in combinations, show these "observation interval" limitations, nor the limitation of, for example, "means for processing a plurality of loop back packets received via a reverse traffic channel, wherein each loop back packet covers zero or more test packets received during an observation interval, and includes a transmission source and a sequence number of every covered test packet received during the observation interval".

However, Examiner respectfully disagrees with Applicant's assertion. The cited prior art do indeed teach the cited limitations. Specifically, Malmivirta teaches receiving a plurality of test packets of known test data via a forward traffic channel, forming a plurality of loop back packets covering all test packets received test packets (column 7 lines 40-45, columns 7-8 lines 58-8, As soon as the G loop has been closed the test

equipment can start sending test data. Testing is preferably carried out such that the test equipment generates test bursts in which the information bits contain desired "raw data", i.e. bit combinations the reception of which is to be examined. Functionally, data transmission and reception occur on the physical protocol level called Layer 1. When the G loop is closed the mobile station loops in principle the information bits of every burst received on the downlink data channel back to a certain uplink burst. It is here assumed bursty transmission. The same principle can easily be generalized to apply to a situation in which the transmission is continuous; this concerns especially the testing of mobile stations in systems utilizing the code division multiple access (CDMA) method. In the exemplary GSM system each burst has 114 information bits to loop back, excluding the so-called stealing flags. Preferably the loopback does not depend on the contents of the so-called midamble of the received downlink bursts. In uplink bursts the mobile station uses the midamble that it would use anyway. The test equipment receives the uplink bursts sent by the mobile station and demodulates and decrypts them so that the information bits in a received burst can be processed by the test equipment); and transmitting the loop back packets via reverse traffic channel (column 7 lines 58-60, when the G loop is closed the mobile station loops in principle the information bits of every burst received on the downlink data channel back to a certain uplink burst). In regards to claims 63, 67 and 68 Malmivirta further teaches data transmission comprises data for determining a packet error (column 8 lines 5-10, The test equipment receives the uplink bursts sent by the mobile station and demodulates and decrypts them so that the information bits in a received burst can be

processed by the test equipment. To compute the bit error ratio (BER) the test equipment compares the received information bits to the raw data it sent to the mobile station). Kobayasi in the same field of endeavor teaches, (column 2 lines 55-67) a test being started by issuing a test connectionless packet transmission request message (test start request) from the OS center 1 to SW station 3. The request message contains an identification information ID indicating terminal SW station 6. SW station 3 generates a test packet with the identification address of terminal SW station 6 set as its destination address DA and the identification address of its home station (SW station 3) set as its source address SA (i.e. transmission source). The test packet is output to terminal SW station 6. In SW stations 4 and 5, test packets are processed as normal packets and transferred to terminal SW station 6. On receipt of the test packet, terminal SW station 6 outputs the packet with its DA and SA inverted (satisfying the forming step). That is, the packet is returned from terminal SW station 6 to SW station 3, and it is reported to the OS center 1 upon re-arrival of the packet at the source SW station 3. Kobayasi teaches (column 97 lines 45-46) Loopback of a test cell is done in a 156 Mbps cell highway. In regards to claims 62 and 65 Kobayasi teaches buffers (fig 132) for data packets. Sjoblom in the same field of endeavor teaches identifying sequence number in test packets and forming test packets including the sequence number (paragraphs 0023 and 0026). Brady in the similar field of endeavor teaches in column 4 lines 35-38, relay 48 includes a timer built therein which holds the relay in the loopback position for a predetermined period (interpreted as observation interval) of time during which suitable loopback tests may be performed.

Therefore, Applicant's arguments fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references.

<u>Claims 40 and 44:</u>

Applicant argues that (pages 25-26) collecting of statistics does not occur in idle mode within Numminen, and is not shown by the cited passage. The Numminen design is simply in idle mode and receives downlink messages and occasionally sends location update messages – it does not, as expressly claimed, collect a first statistic for a first parameter and not exchange data via the link nor collect the first statistic while performing a testing function. The Numminen reference fails to collect statistics or collect statistics while in an idle state or operate in an idle state while performing testing. The cited Tiedemann paragraph speaks of detecting CRC errors during testing but says nothing about an idle state. In other words, the combination of Numminen and Tiedemann does not show "collecting a first statistic for a first parameter while in an idle state and not exchanging data via the link, wherein collecting the first statistic occurs while performing testing".

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

<u>Claims 45, 56 and 59:</u>

Applicant argues that (page 27) while the Tiedemann listing of rates represents "test bits per frame," it is not information contained in a plurality of test packets. The "test bits per frame" in Tiedemann specifically is not included in the Tiedemann test packets; rather, it is the bits per frame at which the Tiedemann data packets are transmitted. The claim requires a container (test packets) comprising information for multiple metrics (rates being tested), while Tiedemann shows multiple metrics. These are two different concepts, and again, the Tiedemann test packets do not include this information.

However, Examiner respectfully disagrees with the Applicant's assertion. The current claim language is broad, and in view of the broadest reasonable interpretation of the claim language, the cited prior art do indeed teach the cited limitation. Specifically, Tiedemann in the same field of endeavor teaches the system allows the test sequence of digital data to be transmitted at one of a set of known data rates, with the receive station being disposed to identify the data rate associated with each test sequence of digital data. In a preferred implementation transmission of the test sequence involves generating a first plurality of data packets, which collectively comprise the test sequence of digital data. Each data packet is assigned one of a multiplicity of data rates in accordance with a first pseudorandom process, and is then transmitted at the data rate assigned thereto (abstract). Tiedemann in the same field of endeavor teaches plurality of test packets comprising information for a plurality of rates being tested for the traffic channel (column 9 lines 30-33 and TABLE II, Referring now to TABLE II, there are listed

the number of bits included <u>(i.e. information)</u> within the sequences comprising a set of exemplary data packets transmitted at various data rates).

23. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "information contained", "a container (test packets) comprising information for multiple metrics (rates being tested)") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Therefore, in view of the broad claim language, Tiedemann does indeed teach the limitation "comprise information"; because, TABLE II, there are listed the number of bits included <u>(i.e. comprising information)</u> within the sequences comprising a set of exemplary data packets transmitted at various data rates. Therefore, "the number of bits <u>included</u> within the sequences comprising a set of exemplary <u>data packets</u> transmitted" indeed satisfy the claimed limitation.

<u>Claims 57, 64 and 66:</u>

Applicant argues that (page 29) the claimed "forming" limitation is "forming a plurality of test packets for transmission on the reverse traffic channel, wherein each test packet includes a sequence number of a test packet last transmitted at each of a plurality of possible rates." The Kobayashi col. 2, col. 3, col. 97, and FIGs. 582-628 do not show such a design, i.e. one where each test packet includes a number of a test

packet transmitted at each of a plurality of possible rates. The Office Action simply states that a Kobayashi discloses "protocol type, packet type, number of records field, time interval, source address, sequence number in the packets shown..." but none of these is "a sequence number of a test packet last transmitted at each of a plurality of possible rates."

However, Examiner respectfully disagrees with Applicant's assertion. Rather, Sjoblom (not Kobayasi) in the same field of endeavor teaches identifying sequence number in test packets and forming test packets including the sequence number (paragraphs 0023 and 0026). On the other hand, Kobayasi in the same field of endeavor teaches, (column 2 lines 55-67) a test being started by issuing a test connectionless packet transmission request message (test start request) from the OS center 1 to SW station 3. The request message contains an identification information ID indicating terminal SW station 6. SW station 3 generates a test packet with the identification address of terminal SW station 6 set as its destination address DA and the identification address of its home station (SW station 3) set as its source address SA. The test packet is output to terminal SW station 6. In SW stations 4 and 5, test packets are processed as normal packets and transferred to terminal SW station 6. On receipt of the test packet, terminal SW station 6 outputs the packet with its DA and SA inverted. That is, the packet is returned from terminal SW station 6 to SW station 3, and it is reported to the OS center 1 upon re-arrival of the packet at the source SW station 3. Kobayasi teaches (column 97 lines 45-46) Loopback of a test cell is done in a 156 Mbps cell highway (satisfying selecting rates for the test packets based on a rate selection scheme, rate being 156 Mbps). Kobayasi

discloses protocol type, packet type, number of records field, time interval, source address, sequence number in the packets shown in FIGS. 582 through 628. Kobayasi teaches (column 3 lines 5-10) that since the source SW station 3 and the terminal SW station 6 mark the time stamp onto the payload field of the packet, the OS center 1 is informed of the transmission time of packets according to the information. Furthermore in response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant argues that (page 30) with respect to the "receiving" limitation, this requires a first message being received that includes a minimum and maximum rate for data transmission on the reverse traffic channel. It is not clear where this limitation is purportedly shown. However, Applicants note that, as discussed above, the Tiedemann reference fails to show receipt of a first message that includes a minimum and maximum rate for data transmission on the reverse traffic channel. Tiedemann, while presenting various rates in Table II and the associated text, does not provide rates, particularly maximum and minimum transmission rates for data transmission on the reverse channel, in a test message. Thus the receiving limitation of claim 57 is not shown by any of the cited references, alone or in combination.

However, Examiner respectfully disagrees with Applicant’s assertion. Tiedemann in the same field of endeavor teaches the system allows the test sequence of digital data to be transmitted at one of a set of known data rates, with the receive station being

disposed to identify the data rate associated with each test sequence of digital data. In a preferred implementation transmission of the test sequence involves generating a first plurality of data packets, which collectively comprise the test sequence of digital data. Each data packet is assigned one of a multiplicity of data rates in accordance with a first pseudorandom process, and is then transmitted at the data rate assigned thereto (abstract). Furthermore, Ikeda (not Kobayasi) teaches message having maximum and minimum rate for rate selection (column 8 lines 38-39). In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Claims 64 and 66:

Applicant argues that (page 31) the "sequence" limitations related to each "test packet" are not shown in Kobayashi, and the "a minimum rate and a maximum rate" are not shown by Tiedemann, nor any of the other cited references, alone or in combination. Claims 64 and 66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Malmivirta, in view of Tiedemann, Kobayasi, ikeda and and Sjoblom (US PAT PUB 2002/0009053). In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant argues about the number of references used and alleges hindsight reasoning in pages 32-34.

In response to applicant's argument, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See In re McLaughlin, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in

the art. See In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and In re Jones, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

In response to applicant's argument that the examiner has combined an excessive number of references, reliance on a large number of references in a rejection does not, without more, weigh against the obviousness of the claimed invention. See In re Gorman, 933 F.2d 982, 18 USPQ2d 1885 (Fed. Cir. 1991).

Applicant's arguments fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references.

Therefore, the claims stand rejected.

Examiner's Note: Examiner has cited particular columns, line numbers and/or paragraphs in the references applied to the claims above for the convenience of the applicant. Although the specified citations are representative of the teachings of the art and are applied to specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the applicant in preparing responses, to fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the Examiner.

24. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Conclusion

25. Any inquiry concerning this communication or earlier communications from the examiner should be directed to SALMAN AHMED whose telephone number is (571)272-8307. The examiner can normally be reached on 9:00 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ayaz Sheikh can be reached on (571)272-3795. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Salman Ahmed/

Primary Examiner, Art Unit 2476